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Entertainment and Communication

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Model: E38, E39 and E53

Production: Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Understand the Operation of the MID

- Understand Audio System Configuration

- Operate OBC Functions

- Understand Basic Telephone Systems

Multi-Information Display

The Multi-Information display (MID) is a part of the overall driver information system. It is also a part of the overall design objective to create a more simplified and tranquil interior. The MID is used on the E38, E39 and E53 models as standard equipment (instead of the optional On-Board Monitor Navigation).

The MID on the E38 is only used available until the 98 model year. Beginning with the 99 model year, the On Board Monitor Navigation system is standard equipment.

The MID allows the following design goals to be achieved:

- Overall reduction in buttons and controls

- More simplified operation

- Displays which are easier to understand

- More precise driver information

- Higher visibility of text

- High quality appearance

The MID incorporates the controls for the audio system, telephone and the on board computer. Since the same format is used to control each of these systems, operation is more convenient.

The MID does not perform any calculations. It is an input request/display unit using the bus network to communicate with IKE/Kombi and other systems.

There are two versions of the MID, one for use with "high version" clusters and one for use with "base clusters". Also the E38 MID differs slightly in design with the E39/E53.
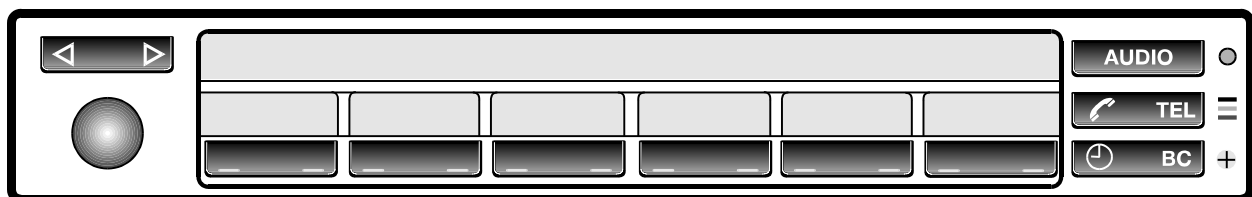
MID (E38) 95-98 only
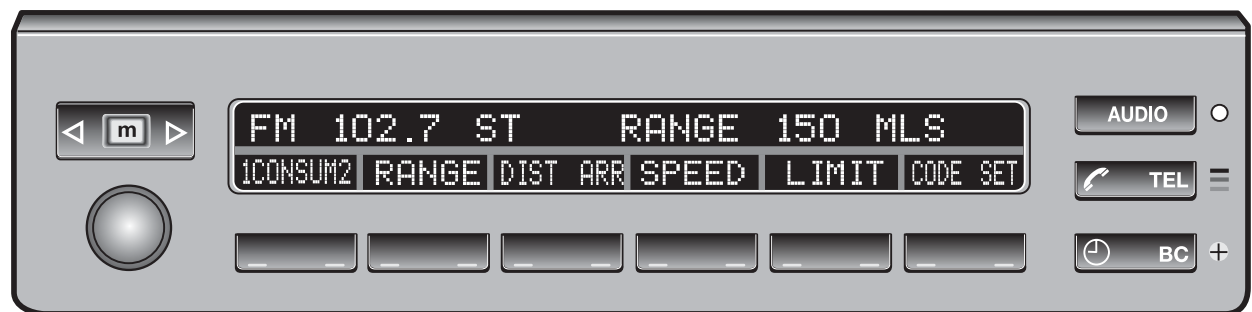
MID (E39/E53)
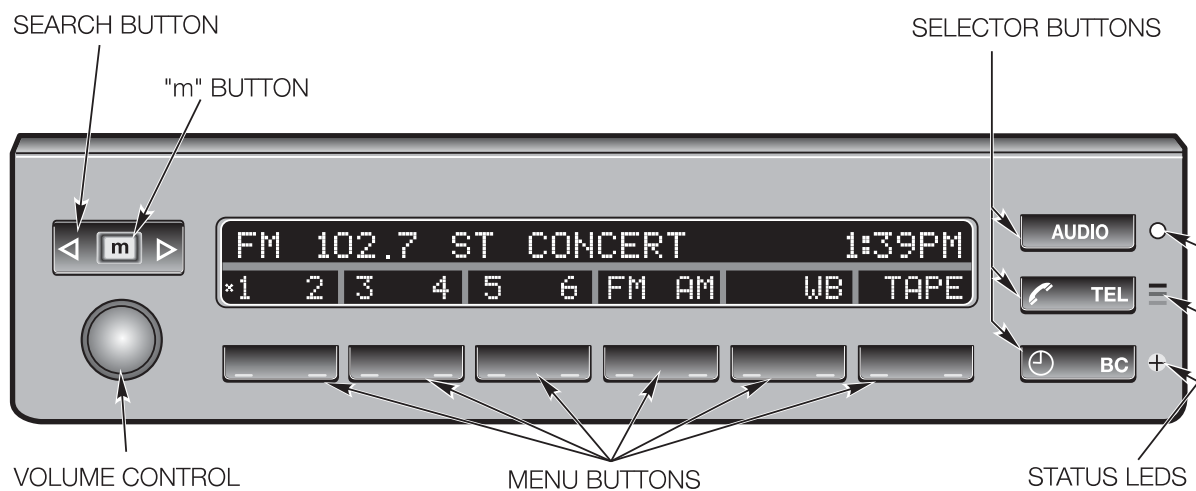
The MID is designed with two displays:

- **Main Display** - A 32 character display presentation for primary information.

- **Menu Display** - 6 small displays for labeling function buttons.

For the purposes of this training module, the MID shown will be the E39/E53 version. The E38 MID is operated in a similar fashion and has the same controls.

The MID also uses the following buttons and indicators:

- **Menu Buttons** - The buttons are designed as rocker switches having a left and right side contact. The function of each button changes as the different systems are selected.

- **Selector Buttons** - These are used to select the desired system such as Audio, Telephone and the Clock/BC functions.

- **Search Button** - Will activate the search feature for the Radio, Tape and/or CD.

- **Volume Control** - The volume control know provides two functions. As a pushbutton, the know is used to turn the audio system on or off. As a rotary knob, it is used to control audio system volume (also for telephone "hands free").

- **LED's** - There are multiple status LED's which are as follows:

    - A red "fan" symbol indicates the status of parked car ventilation.

    - A set of three colored LED's to indicate phone status

Due to the increased size of the main display, information from more than one system can be displayed at the same time (i.e. radio station and time).

SEARCH BUTTON   SELECTOR BUTTONS

"m" BUTTON

FM 102.7 ST CONCERT   1:39PM
×1   2 3 4 5   6 FM AM   WB TAPE

AUDIO

TEL

BC

VOLUME CONTROL   MENU BUTTONS   STATUS LEDS

MID Self Test

The MID test function is activated by pressing the first and last menu buttons while switching the ignition on. The following items can be tested.

Unit Identification - This information appears for approximately 3 seconds when the ignition is switched on. The ID information displayed is:

- Hardware number
- Software number
- Variant index

All other test functions must be activated while the ID information is displayed. If this is not done, the MID test is cancelled after the ID information is posted.

Display Test - Activate this test by pressing the display menu button. All elements of the main and menu displays are illuminated with different check patterns.

Button test - Start the test by pressing the button test menu button. All the buttons on the MID have been assigned an alphabetical letter that will appear when the button is pressed.

Volume control test - The test is carried out by pressing the menu button and turning the volume knob. Numbers from 01 to 36 appear on the display indicating each step of knob rotation.
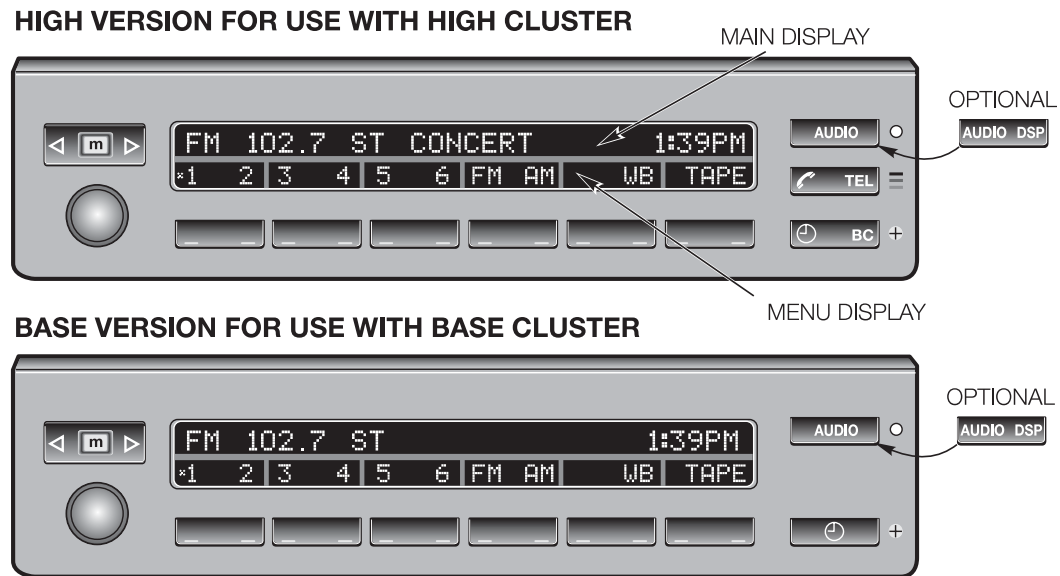
Status LED test - Activate the test by pressing the menu button. All status LEDs are illuminated.

PRESS SIMULTANEOUSLY THEN SWITCH ON IGNITION
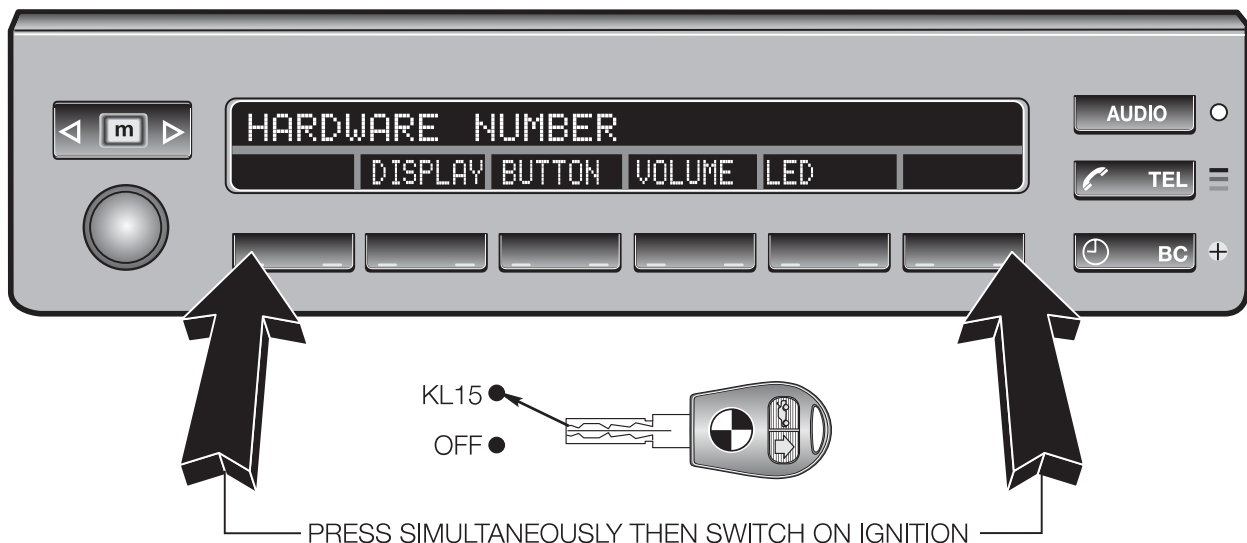
MID Comparison

Both the "High" and "base" MID are used for control and display of the radio/tape/CD changer and clock.

If installed, the Digital Sound Processor (DSP) will also be adjusted and controlled through the MID.

HIGH VERSION FOR USE WITH HIGH CLUSTER

MAIN DISPLAY

OPTIONAL

FM 102.7 ST CONCERT   1:39PM

×1   2 3   4 5   6 FM AM   WB TAPE

AUDIO   o

AUDIO DSP

TEL ≡

BC +

MENU DISPLAY

BASE VERSION FOR USE WITH BASE CLUSTER

OPTIONAL

FM 102.7 ST   1:39PM

×1   2 3   4 5   6 FM AM   WB TAPE

AUDIO   o

AUDIO DSP

+

On Board Computer (BC)

The processing and display of the on-board computer functions is carried out by the IKE/Kombi. The IKE/Kombi receives and evaluates all of the BC required data. The BC functions can be called up for display on the MID or the Instrument Cluster matrix.

The following BC functions are available for display:

- Time
- Date
- Average speed
- Range
- Distance
- Arrival Time
- Limit
- Code
- Timer/Stopwatch
- Average fuel consumption

All of the above BC functions are available with the "high version", some of the functions are not available with the "base" BC.

The outside temperature measurement is no longer a BC function. The temperature is continuously displayed in the instrument cluster and is used to activate the freeze warning.

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BC Operation
Operation and programming the BC functions has changed to suit the new MID layout.

Entering time/date

1. Press clock button

2. Set time with menu buttons

3. Press set button to start the clock - Date is automatically displayed, program date with the same procedure.

Reset time

1. Call up clock with clock button

2. Press clock button again

3. Press the "Set" button

4. Reset time

5. Press set button to restart clock

Reset date

1. Press the clock button twice

2. Select the date function

3. Press the "set" button

4. Reset the date

5. Press "set" button to acknowledge the new date
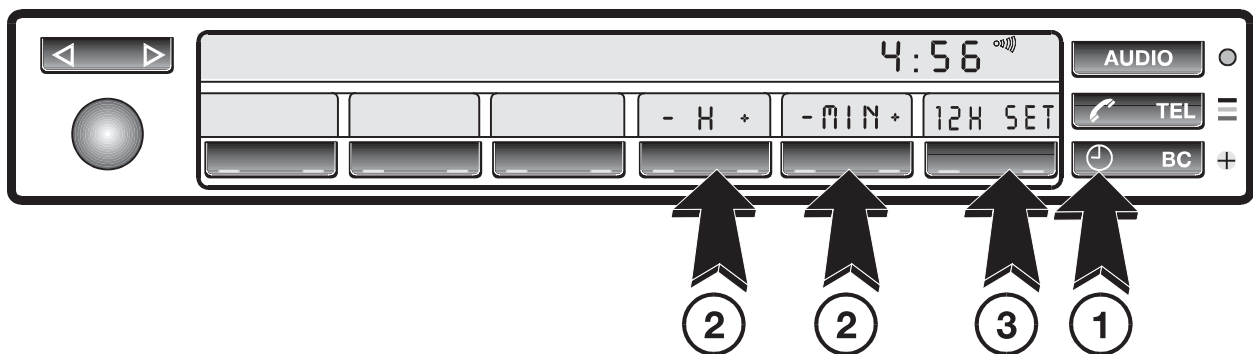
The remaining BC functions can be displayed by pressing the BC button. Each function is called up by pressing its menu button.

Programming Functions

- Call up functions to be programmed

- Using menu button

- Press "set" button - menu switch to numbers for entering data

- Program function

- Press "set" button to acknowledge data

Resetting Non-programming Functions

- Call up function using menu button

- Press "set" button - function is reset

Change Over Button - The change over button is the left toggle of the set button.

- 12H OR 24H is displayed in the change over menu when resetting the time. Pressing the button will change all time calculations between a 24 hour and 12 hour clock display.

  The date change over is activated with the clock change over. A 12 hour clock yields a month/day/year date display.

- MLS OR KM is displayed in the change over menu when a distance or speed function is called up. Pressing the button will change all distance between kilometers and miles readings and speed.

- MPG or L/KM is displayed in the change over menu when a consumption function is called up. Pressing the button will change both consumption displays at the same time.
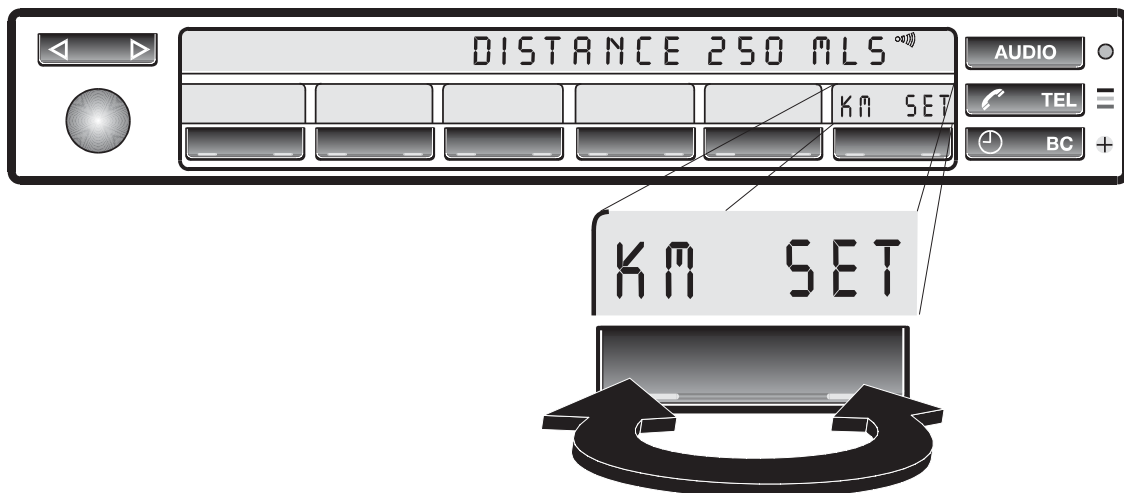
BC information can be displayed in the instrument cluster by pressing the remote switch on the end of the turn signal lever. The matrix display is blacked out when the remote switch is pressed after the last function is posted. The order and quantity of functions to be displayed in the instrument cluster can be programmed.

1. Press and hold remote switch until "Prog" appears in both displays. The programming feature is now active.

2. Use MID buttons to select functions to be displayed in the cluster. The function title appears in the MID.

3. The programming function are acknowledged by pressing either the "set" button or remote switch.
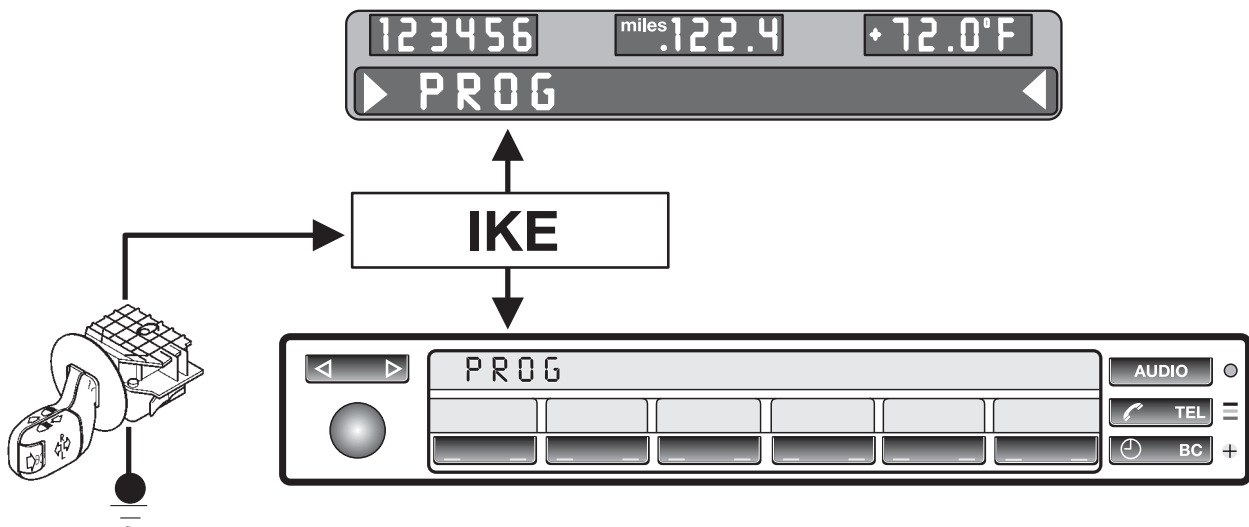
Code Functions

Because of the Immobilizer module installed in the E38, the code function is modified. The immobilizer module is utilized when the code is set. The KL 50 circuit is deactivated and driveway protection is engaged.

With this change, the alarm horn is only activated when the third incorrect code number is entered. The alarm is deactivated by entering the correct code and pressing the "set" button.

Emergency deactivation: If the code is forgotten, the function can be cancelled by engaging the emergency deactivation countdown. The 10 minute countdown is activated by disconnecting the battery for one minute and switching on KLR.

Audio Systems

The audio systems available for the E38, E39 and E46 include a standard 10-Speaker system as well as an optional 14-speaker (E38) or 12-speaker (E39/E53) system with Digital Sound Processing (DSP).

E39/E53 "high version" MID and Radio with DSP

These system are controlled via the MID or Board Monitor (if equipped).

Radio/Tape or CD Player
This unit houses radio electronics, tape or CD player, treble, bass, fader, balance adjustments. From 2001, models **without** Navigation have the option of an in-dash CD player. Up until 2001, only the tape player was available.

Multi-Information Display
The MID contains the controls for ON/OFF, volume, station selection, DSP control (E39/E53).

On the E39/E53, if the DSP system is installed, the audio button in the MID has a second position to activate the controls.

Except for the number of memory positions for DSP programming, all of the features of the separate E38 DSP switch panel are incorporated into the MID. The memory feature of the E39 DSP has two memory positions whereas the E38 has three.

Amplifier
The amplifier is mounted in the trunk on the left hand side. The standard audio system uses a 200 watt amplifier for the 10 speaker non DSP audio system. The optional 14 or 12 speaker 440 watt amplifier for the DSP audio system.

CD Changer
The optional 6-disc CD changer is mounted in trunk if equipped.

MFL Controls

The Multi-function steering wheel controls are used to control volume and station/track selection.

AFTER 9-96 PRODUCTION
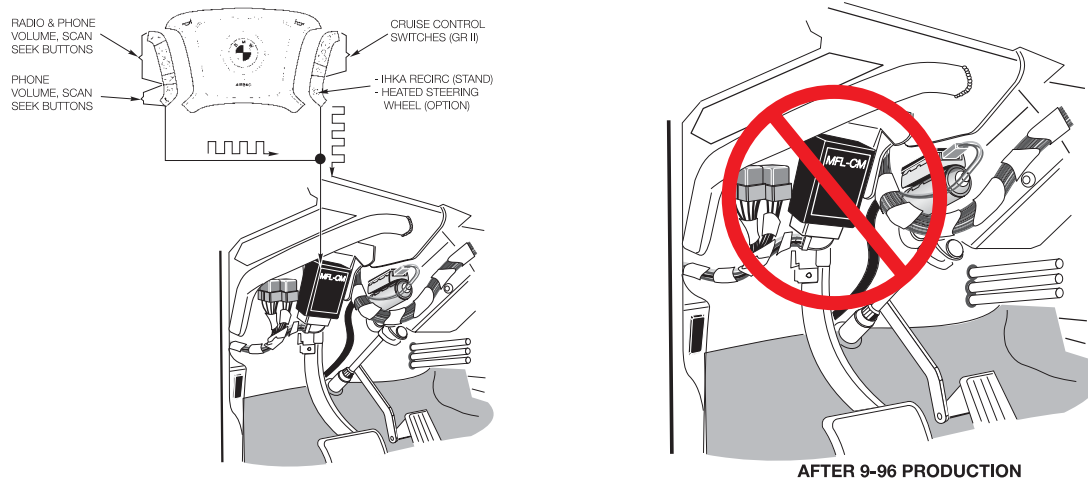
The early production E38 utilized a separate MFL control module as an interface with the I-Bus, later models omitted the separate MFL control unit and the MFL button pads contained the necessary electronics for the I/K-Bus interface.

Digital Sound Processing

DSP gives the user the possibility of selecting from three preset acoustic environments (concert hall, cathedral, jazz club). Or the user can custom tailor three environments on the basis of acoustic parameters such as room size, reverberation time and equalizer characteristics, and capture them in three memory settings.

There's also a DEMO function to demonstrate the system's capabilities.

On the E38, there is a separate DSP graphic equalizer in the dash. The E39/E53 have the DSP functions integrated into the MID control panel.

Both audio systems have the same main audio panel integrated into the MID, the same upper control-panel cover, and a further refined diversity antenna system with a total of four antenna circuits for improved FM stereo reception.

The DSP is an available option that cannot be retro-fitted to the vehicle. The system includes a different wiring harness, DSP amplifier and speakers for audio system operation. The DSP control panel and DSP amplifier are connected to the I/K-Bus for data communication with the audio system.

Anti-theft Feature

The new MID/BMBT based audio system consists of individual components dispersed on a network. The audio system is therefore rendered useless in any other vehicle. Therefore the previous anti-theft radio feature has been omitted from this system.

Antenna Systems

Antenna Diversity

The antenna systems used on BMW vehicles use a diversity antenna system. This is a multiple antenna system, with a diversity switching module which continually monitors and selects the best antenna signal.

One antenna is connected for the AM band and three separate antennas for the FM range. The three FM signals received are switched in the diversity amplifier through to the radio cyclically via the RF line. The radio sends a feedback signal relating to the quality of the received antenna signal (the intermediate frequency signal) to the antenna diversity system. The antenna diversity system decides which of the three antennas has the best reception quality at present and switches this antenna through to the radio until the next measuring cycle is carried out. The antenna (FM1) arranged vertically in the rear window is used in the case of interference in the intermediate frequency signal.
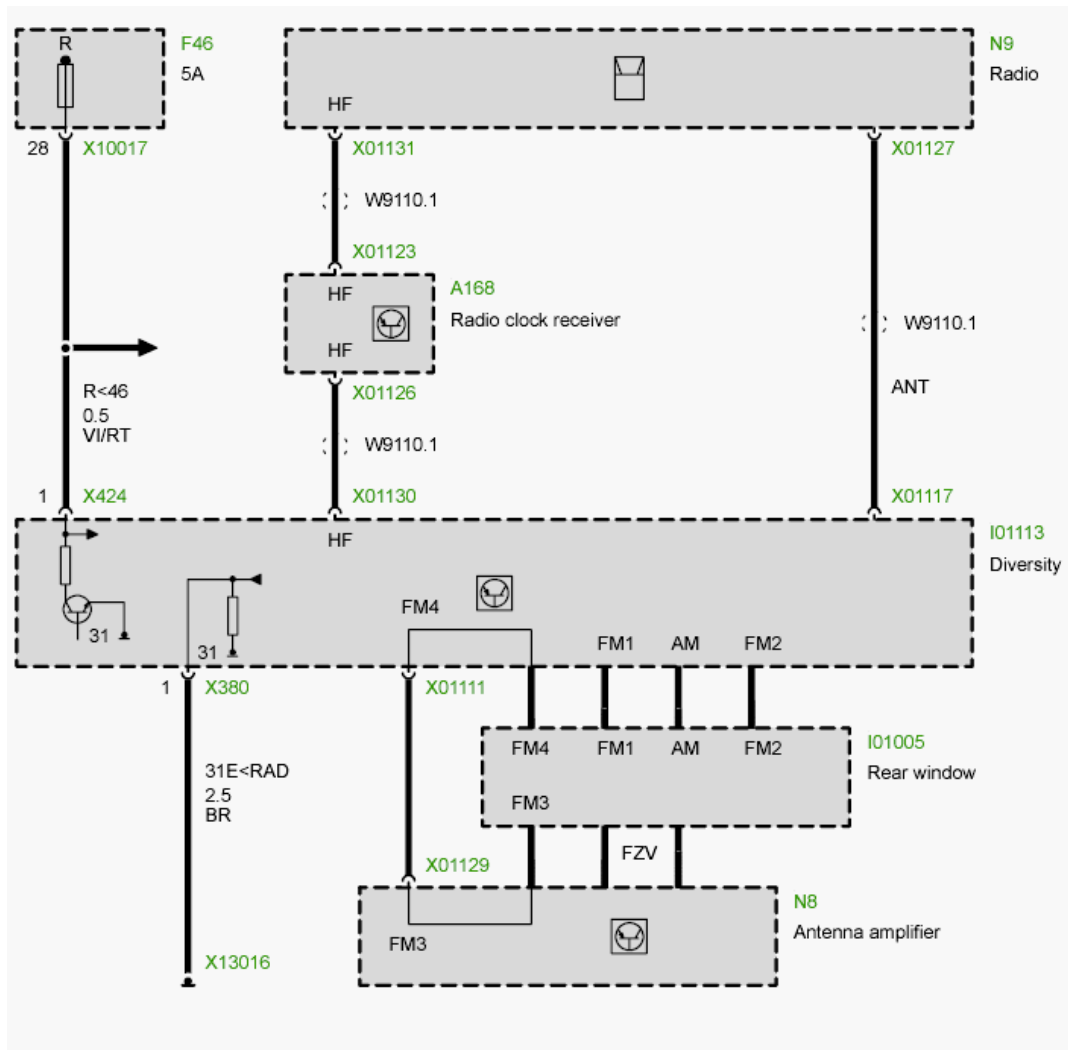
Each vehicle uses a different antenna configuration. The AM and FM antennae are integrated into the rear window glass.

On vehicles such as the E53 and E39 sportwagon, the side window glass and rear spoiler are also used to house antenna system components.

FZV Antenna   AM/FM2 Antenna   FZV/FM 2 AMP   FM 1 AMP   FM 1 Antenna   TO GM III (FZV)   TO RADIO
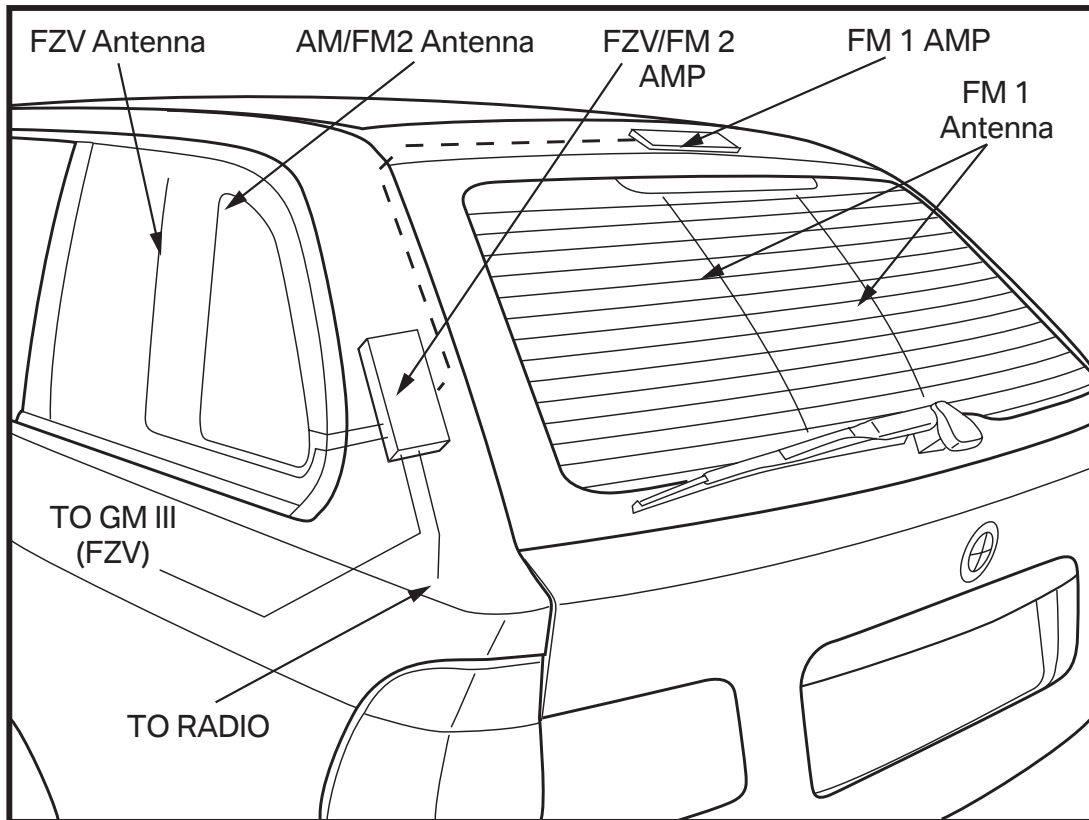
Radio Test Functions

With the ignition switch in KL R the radio can be switched into the test function mode by pressing and holding the WB (weather band) until the MID displays a serial number in the MID main display.

The test functions include:

- Radio Serial Number
- Radio Production Date
- DSP Recognition
- Road speed dependent volume control (GAL 1-4)
- Station Signal Strength

The road speed dependent volume control can be adjusted to make the volume increase more audible (4) or less audible (1).

Telephone Systems

The E38, E39 and E53 have the capability for telephone integration due to the layout of the bus network.

With the exception of the E38 750iL, the phone is a dealer installed option. The E38 750iL is a factory (port) installed phone system.

Depending upon the model year and specific vehicle, there have been numerous phone system configurations used.

Upon introduction, the E38 was equipped with CMT 3000VR. The CMT 3000VR was specifically designed for the E38 7 series. As with the other subsequent phone systems, the CMT 3000VR phone system is integrated into the vehicle. This integration is possible by way of the I-Bus allowing shared functions of the MID, MFL and instrument cluster.

Many of the CMT 3000VR features will carry over into later BMW mobile phones such as:

- I/K-Bus Interface - The telephone is linked to the IKE/Kombi for display of telephone numbers in the Matrix display. The MID also allows telephone number display and system control. The MFL provides for control at the steering wheel and the Radio/ Amplifier provides for automatic muting and audio system speaker use when in hands free operation.

- Road Speed Sensitive Volume - When in hands-free operation the volume of the telephone will increase slightly with an increase in road speed. The Eject box/PSE receives Speed signal "A" from the IKE for monitoring vehicle speed.
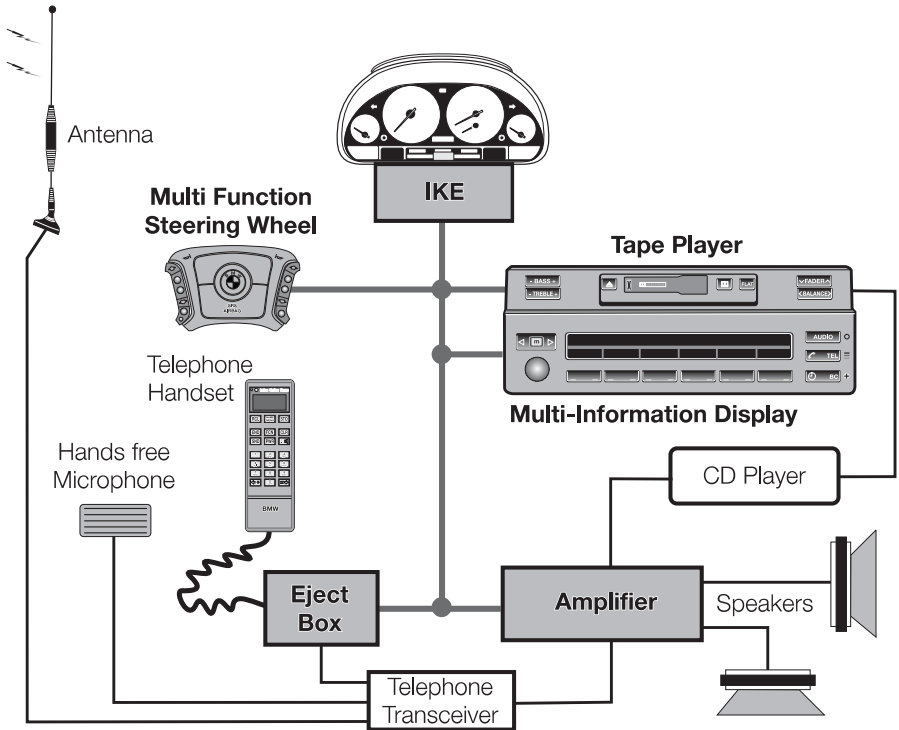
Beginning with the CMT 3000VR in 1995, there have numerous cellular phone systems used with various configurations.

The phone designations indicate some of the features available. For instance, the CMT 5000 VR telephone designation indicates the following; the CMT indicates Cellular Mobile Telephone and the VR designation indicates Voice Recognition. The CMT phones are integrated into the vehicle, but are not portable. In other words, the handset cannot be removed from the vehicle.

On the other hand, phones with the CPT designation are portable. The handset can be removed from the vehicle and used as an independent cell phone. Once plugged into the vehicle, the phone is then fully integrated into the vehicle.

Some of the phone systems used include:

- **CMT 3000 VR** - The CMT 3000 VR is a non-portable analog cellular phone system used from approximately 95 model year until late 97. This is a Phase IV phone system in which the I-Bus is directly connected to the eject box. The handset is integrated into the center armrest and is not removable from the vehicle.

- **CMT 5000 VR** - The CMT is a non-portable analog cellular phone system used in 1998 model year vehicles. The CMT 5000VR is a Phase V phone in which the I-Bus is not directly connected to the eject box. The handset is integrated into the center armrest and is not removable from the vehicle.

- **CPT 6000 VR** - The CPT 6000 VR is the first portable integrated phone in the BMW model line. This system uses an analog Motorola handset.

- **CPT 7000** - The CPT 7000 phone system uses the digital Motorola StarTAC™ handset. This system is also capable of utilizing voice recognition technology. The Voice Recognition System (SES) is a separate module and not part of the handset. The system uses a Portable Support Electronics unit (PSE) to allow the handset to interface with the vehicle. The CPT 7000 phone system is used on 2000 model year vehicle.

- **CPT 8000** - The CPT 8000 phone system utilizes the Motorola Timeport™ portable phone. This system is designed for use in 2001 model year vehicles. This is a
digital Telematics system which utilizes a TCU rather than the previous PSE box. This phone system also incorporates SES functions.